



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/753,403	01/09/2004	Dong-ryeol Park	033808-010	6389
21839 7590 02/14/2008 BUCHANAN, INGERSOLL & ROONEY PC POST OFFICE BOX 1404 ALEXANDRIA, VA 22313-1404				
EXAMINER BROADHEAD, BRIAN J				
ART UNIT 3664		PAPER NUMBER		
NOTIFICATION DATE 02/14/2008		DELIVERY MODE ELECTRONIC		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

ADIPFDD@bipc.com

# Office Action Summary

**Application No.**

10/753,403

**Applicant(s)**

PARK ET AL.

**Examiner**

BRIAN J. BROADHEAD

**Art Unit**

3664

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 24 October 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SF/ICE)  
Paper No(s)/Mail Date 10-24-07, 8-30-07
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Information Disclosure Statement*

1. The information disclosure statement filed on 8-30-07 does not fully comply with the requirements of 37 CFR 1.98(b) because: There is not a statement of relevance for the action from the JPO. Since the submission appears to be *bona fide*, applicant is given **ONE (1) MONTH** from the date of this notice to supply the above mentioned omissions or corrections in the information disclosure statement. **NO EXTENSION OF THIS TIME LIMIT MAY BE GRANTED UNDER EITHER 37 CFR 1.136(a) OR (b).** Failure to timely comply with this notice will result in the above mentioned information disclosure statement being placed in the application file with the noncomplying information **not** being considered. See 37 CFR 1.97(i).

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1 through 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Goncalves et al. US 2004/0167670, in view of Junkins et al., 6266142, in further view of Clegg et al., 5477459.

3. Goncalves et al. disclose an image processing module (602) for calculating image coordinates at least one of the plurality of the light sources by detecting the light sources, controlled to flicker in response to the light source control signal, from an

Art Unit: 3664

image signal obtained by a camera (this would be included in with the landmarks), a pose calculation module for calculating coordinates of the mobile robot using the calculated image coordinates and previously stored world coordinates of the light sources a motion control module for calculating a moving path for the mobile robot by applying the position coordinates of the mobile robot to previously stored spatial coordinates of the working space and controlling the mobile robot to move along the moving path; and a main control module for controlling interoperations of the modules and general operations of the mobile robot; further comprising a memory module for storing the world coordinates of the light sources, spatial coordinates of the mobile robot in the working space, and parameters calculated through camera calibration for compensating for distortion of a lens of the camera, wherein the pose calculation module calculates translation and rotation of the robot by applying the image coordinates and the world coordinates to the specified position calculation algorithm, the pose calculation algorithm is a certain transformation matrix equation that is obtained by constructing an extension model for obtaining a translation and a rotation of the camera using a world coordinate system and a camera coordinate system and applying the extension model to a formula for compensating for distortion caused by a lens of the camera; the pose calculation module calculates translation and rotation of the robot by applying image coordinates and world coordinates to a certain pose calculation algorithm, an image processing module for detecting feature points of the light source, controlled to flicker through the communications module, from an image signal obtained by a camera; a motion control module for controlling the mobile robot to move under

control of the main control module; and a memory module for storing parameters calculated through camera calibration for compensating for distortion caused by a lens of the camera, world coordinates of the light sources, and spatial coordinates of the mobile robot in a working space; wherein the pose calculation algorithm is a certain transformation matrix equation that is obtained by constructing an extension model for obtaining a translation and a rotation of the camera using a world coordinate system and a image coordinate system, and applying the extension model to a formula for compensating for distortion caused by a lens of the camera in paragraphs 75, 14, 160, 84, 51-56.

4. Goncalves et al. do not disclose a communications module for transmitting a light source control signal to selectively control flickering of a plurality of light sources of a landmark array provided in a working space; a landmark array comprising a plurality of light sources disposed in a certain area to selectively flicker; a landmark array control module for controlling the light sources of the landmark array to flicker; and an access point for receiving and processing the light source control signal transmitted from the mobile robot; the communications type used; and a light source control unit for controlling corresponding light sources to flicker in response to the light source control signal input from the access point; and basing processing on the wavelength of the detected light source and using filters on the camera.

5. Junkins et al. teach a communications module for transmitting a light source control signal to selectively control flickering of a plurality of light sources of a landmark array provided in a working space on lines 14-20, on column 5; a landmark array

comprising a plurality of light sources disposed in a certain area to selectively flicker on lines 40-55, on column 4; a landmark array control module for controlling the light sources of the landmark array to flicker (28); and an access point for receiving and processing the light source control signal transmitted from the mobile robot (82); and a light source control unit for controlling corresponding light sources to flicker in response to the light source control signal input from the access point on lines 14-20, on column 5. Junkins et al. inherently uses some type of wireless communications protocol. It would have been obvious to one of ordinary skill in art at the time the invention was made to use the beacons of Junkins et al. in the invention of Goncalves et al. because such modification would provide a non-contact measurement system that compensates for distance and environmental conditions as disclosed by Junkins et al.

6. Gonclaves et al. and Junkins et al. do not disclose basing processing on the wavelength of the detected light source and using filters on the camera. Clegg et al. discloses basing processing on the wavelength of the detected light source and using filters on the camera on lines 40-52, on column 17. It would have been obvious to one of ordinary skill in the art to wavelength detection and filtering in the invention of Gonclaves et al. and Junkins et al. because such modification would reduce noise from ambient light and increase the signal to noise ratio for the beacon signal received by the camera. This is a fairly standard practice in the art.

### ***Response to Arguments***

7. Applicant's arguments with respect to claims 1-20 have been considered but are moot in view of the new ground(s) of rejection.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to BRIAN J. BROADHEAD whose telephone number is (571)272-6957. The examiner can normally be reached on Monday through Thursday or Tuesday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Khoi Tran can be reached on 571-272-6919. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Brian J. Broadhead/  
Examiner, Art Unit 3664  
BJB